Claims

1.   An image compositing apparatus that composites images together into a final composite image, the images including a video image and a plurality of graphical images, the image compositing apparatus comprising:

first obtaining means that obtains the graphical images and composition information including an image compositing order, the composition information being used for calculating a composition ratio of each of the images to the final composite image;

first compositing means that composites the graphical images to generate one composite graphical image according to the composition information;

calculating means that calculates a composition ratio of the video image to the final composite image according to the composition information;

second obtaining means that obtains frames of the video image; and

second compositing means that composites one of the obtained frames at a time with the composite graphical image using the composition ratio of the video image.

2.   The image compositing apparatus of Claim 1, wherein the composition information further includes:

coefficients, each of which corresponds to a different one of the images; and

arithmetic information which has blending algorithms which each correspond to the images, the blending algorithms using the coefficients.

3. The image compositing apparatus of Claim 2, further comprising a first frame buffer that stores images, and a second frame buffer that stores frames of the video image, wherein

the first compositing means reads the graphical images obtained by the first obtaining means, according to the image compositing order, composites each of the read graphical images with a storage content of the first frame buffer using the coefficients and the arithmetic information, and replaces the storage content of the first buffer with a result of compositing one of the read graphical images with the storage content,

the second obtaining means stores the obtained frames in the second buffer, and

the second compositing means composites each of the frames stored in the second buffer with an image in the first frame buffer using the composition ratio of the video image.

4. The image compositing apparatus of Claim 3, wherein
the first compositing means performs a blending algorithm on the image in the first frame buffer using a coefficient and arithmetic information corresponding to the video image after compositing a graphical image immediately preceding the video image in the compositing order and before compositing a graphical image immediately succeeding the video image with the storage content, and replaces the content of the first frame buffer with a result of the blending algorithm.

5. The image compositing apparatus of Claim 3, further

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comprising a display screen, wherein

the first compositing means generates the composite graphical image, the second obtaining means obtains the frames, and the second compositing means composites the frames with
5 the composite graphical image in parallel with each other.

6. The image compositing apparatus of Claim 1, wherein

the composition information further includes a composition coefficient for each of the images, each
10 composition coefficient indicating a composition ratio of one of the images to a composite of the image with at least another one of the images.

7. The image compositing apparatus of Claim 6, further
15 comprising a first frame buffer that stores images, and a second frame buffer that stores frames of the video image, wherein

the first compositing means reads the graphical images according to the image compositing order obtained by the first
20 obtaining means, composites each of the read graphical images with a storage content of the first frame buffer using the composition coefficients, and replaces the storage content of the first buffer with a result of compositing one of the read graphical images with the storage content,

25 the second obtaining means stores the obtained frames in the second buffer, and

the second compositing means composites each of the frames stored in the second buffer with an image in the first frame buffer using the composition ratio of the video image.
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8. The image compositing apparatus of Claim 7, wherein

the first compositing means performs a blending algorithm on the image in the first frame buffer using a composition coefficient corresponding to the video image after compositing a graphical image immediately preceding the video image in the compositing order and before compositing a graphical image immediately succeeding the video image with the storage content, and replaces the content of the first frame buffer with a result of the blending algorithm.

9. The image compositing apparatus of Claim 7, further comprising a display screen, wherein

the first compositing means generates the composite graphical image, the second obtaining means obtains the frames, and the second compositing means composites the frames with the composite graphical image in parallel with each other.

10. The image compositing apparatus of Claim 6, wherein

the image compositing order indicates a first overlaying order of the images,

the composition coefficients are α values, each of which indicates a composition ratio of one of the images to a composite of the image with images below the image in the first overlaying order, and

the calculating means calculates the composition ratio of the video image to the final composite image from α values of the video image and images above the video image in the first overlaying order.

11. The image compositing apparatus of Claim 10, further

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comprising a first frame buffer that stores images, and a second frame buffer that stores frames of the video image, wherein

the first compositing means reads the graphical images
5 starting from a lowest layer according to the image compositing order obtained by the first obtaining means, composites each of the read graphical images with a storage content of the first frame buffer using the α values, and replaces the storage content of the first buffer with a result of compositing one
10 of the read graphical images with the storage content,

the second obtaining means stores the obtained frames in the second buffer, and

the second compositing means composites each of the frames stored in the second buffer with an image in the first
15 frame buffer using the composition ratio of the video image.

12. The image compositing apparatus of Claim 11, wherein the first compositing means performs a blending algorithm on the image in the first frame buffer using an α value
20 corresponding to the video image after compositing a graphical image immediately preceding the video image in the compositing order and before compositing a graphical image immediately succeeding the video image with the storage content, and replaces the content of the first frame buffer with a result
25 of the blending algorithm.

13. The image compositing apparatus of Claim 11, further comprising a display screen, wherein

the first compositing means generates the composite
30 graphical image, the second obtaining means obtains the frames,

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and the second compositing means composites the frames with the composite graphical image in parallel with each other.

14.   The image compositing apparatus of Claim 10, further comprising:

switching means for switching two adjacent images in the first overlaying order to rearrange the images in a second overlaying order; and

updating means for updating α values of the switched two adjacent images so that results of compositing in the first and second overlaying orders are the same, wherein

the first compositing means generates the composite graphical image, the calculating means calculates the composition ratio of the video image to the final composite image, and the second compositing means composites the frames with the composite graphical image using the second overlaying order and the updated α values.

15.   The image compositing apparatus of Claim 14, wherein the two adjacent images are images "i" and "i+1" that are each "i"th and "i+1"th images from a bottom of the first overlaying order, and

the updating means sets α values of the images "i+1" and "i" as $\alpha[i]*(1-\alpha[i+1])$ and $\alpha[i+1]/(1-\alpha[i]*(1-\alpha[i+1]))$, respectively.

16.   The image compositing apparatus of Claim 1, further comprising a storage unit for storing a plurality of graphical images that are obtained by the first obtaining means, wherein the graphical images are each made up of (A) image data

which has pixels, a number of which is no larger than pixels of the final composite image and (B) layout information which indicates a layout of the images on the final composite image, and

5   the first compositing means generates the composite graphical image, the calculating means calculates the composition ration of the video image to the final composite image, and the second compositing means composites the frames with the composite graphical image for an overlapping part of

10   the images that is determined by the layout information.

17.   The image compositing apparatus of Claim 1, further comprising a storage unit for storing the plurality of graphical images obtained by the first obtaining means;

15   the plurality of graphical images are represented by vector data; and

       the first compositing means generates the composite graphical image after converting the vector data to the pixels.

20   18.   An image compositing apparatus that composites images together into a final composite image, the images including a plurality of video images and a plurality of graphical images, the image compositing apparatus comprising:

       first obtaining means that obtains the graphical images

25   and composition information including an image compositing order, the composition information being used for calculating a composition ratio of each of the images to the final composite image;

       first compositing means that composites the graphical

30   images to generate one composite graphical image according to

the composition information;

calculating means that calculates composition ratios of the video images to the final composite image according to the composition information;

5   second obtaining means that obtains frames of the video images one frame at a time; and

second compositing means that composites, each time one frame is obtained, the obtained frame with the composite graphical image using the composition ratios of the video

10   images.

19.   An image compositing apparatus that composites images together into a final composite image, the images including a video image and a plurality of graphical images, the image

15   composition apparatus comprising:

first obtaining means that obtains the graphical images;

first compositing means that composites the graphical images to generate one composite graphical image;

second obtaining means that obtains frames of the video

20   image; and

second compositing means that composites one of the obtained frames at a time with the composite graphical image.

20.   A computer-readable recording medium storing a program

25   that has a computer composite images together into a final composite image, the images including a video image and a plurality of graphical images, the program comprising:

a first obtaining step for obtaining the graphical images and composition information that includes an image compositing

30   order, the composition information being used for calculating

a composition ratio of each of the images to the final composite image;

a first compositing step for compositing the graphical images to generate one composite graphical image according to the composition information;

a calculating step for calculating a composition ratio of the video image to the final composite image according to the composition information;

a second obtaining step for obtaining frames of the video image; and

a second compositing step for compositing one of the obtained frames at a time with the composite graphical image using the composition ratio of the video image.

21.   A program that has a computer composite images together into a final composite image, the images including a video image and a plurality of graphical images, the program comprising:

a first obtaining step for obtaining the graphical images and composition information that includes an image compositing order, the composition information being used for calculating a composition ratio of each of the images to the final composite image;

a first compositing step for compositing the graphical images to generate one composite graphical image according to the composition information;

a calculating step for calculating a composition ratio of the video image to the final composite image according to the composition information;

a second obtaining step for obtaining frames of the video

image; and

a second compositing step for compositing one of the obtained frames at a time with the composite graphical image using the composition ratio of the video image.